Midwater Structures for Enhancing Recreational Fishing

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Little mention has been made at this conference about artificial structures located at midwater depths. Yet this method of attracting fishes offers many advantages over bottom reefs and may solve some of the real problems that we have discussed (labor, transportation costs and potential hazards to navigation). Requisite biological and environmental conditions must be present, as in all reef site locations, for this method to be successful.

Resourceful anglers are aware of the variety of pelagic fishes that can be caught around drifting objects at sea. Only a few, however, actively search and fish these floating objects. For most it is probably a fortuitous encounter, and their fishing success around these objects is also unpredictable. Some anglers devote most of their fishing effort trolling along debris and sargasso weed lines. These are the big game fishermen whose knowledge of oceanic conditions and seasonal distribution of pelagic fishes has improved their strategy.

Not all recreational fishermen can afford to pursue large game fish offshore. Closer inshore, a crude but effective fishing technique is employed in which small pieces of floatable material such as boards or cardboard are scattered on the surface. Hopefully, a few pelagic fishes will be attracted to this debris when the usual trolling methods are unproductive. Because of the low profile of these objects, many become lost from view or simply abandoned after a day's fishing (another source of pollution of the littoral zone). The flat shape and buoyancy of this material results in a low underwater profile as well, limiting the visual range of the structure to fishes. Better techniques are available to the coastal fisherman.

Marine biologists have been interested in the behavior of fishes associated with drifting objects for some time. They have examined questions such as: What are the mechanisms involved in attracting fishes to floating structures? What is the adaptive advantage for fishes commonly associated with this habitat? How can this information be applied to improve or develop new fish harvesting methods? Several hypotheses have been proposed explaining the various relationships between fishes and the objects. The effect of structure configuration and deployment on the attraction of fishes also has been tested (see References).

Edward Klima and Donald Wickham (NMFS) have developed the technique of using moored structures to attract coastal pelagic fishes. The number of bait fish attracted to their artificial structures was impressive, and the rapid rate of recruitment to these small objects was equally surprising (see References).

These experiments were conducted in the northeastern Gulf of Mexico. It is a unique area of the Gulf where oceanic waters impinge upon the beaches. Schools of herrings, anchovies and scads occur in the nearshore zone. In turn, migratory game fish, especially the mackerals and jacks, pursue this bait in coastal and inshore areas and also into the bays. The bait sometimes retreats behind the bars where some protection is afforded them. Offshore, they form "hard" schools in defense against attacks by predators, In this featureless environment, the prey species are attracted to almost any suitable floating object or bottom disconformity. It is a good place to experiment with midwater structures. The requisites here are clear water and attractable fish.

Donald Wickham and John Watson suggested that we collaborate to evaluate the effectiveness of midwater structures in attracting game fish (Figure 1). Results from this experimental fishing showed that significantly greater catches of game species (king mackerel, little tunny and dolphin) were made around the structures than in control

Figure 1.

John Watson inspects a midwater structure moored off Panama City, Florida. Round scad (Decapterus punctatus), an important bait fish in this area, were attracted to this object shortly after it was deployed.

areas. It is important to note that these results were obtained at a time when conventional trolling methods by charter boatmen were unproductive. By deploying the structures at various depths, we determined that more king mackerel were attracted around the structures in shallower waters than those placed in deeper waters. This was probably due to the greater abundance of bait inshore during the warmer months (Figure 2). As water temperatures drop, the schools of coastal pelagic fishes move offshore or southward. Robert Hastings, Michael Mabry and I have described the fish fauna associated with two U.S. Navy research platforms located off Panama City. Our observations give support to these results and general statements about seasonal distribution (see References).

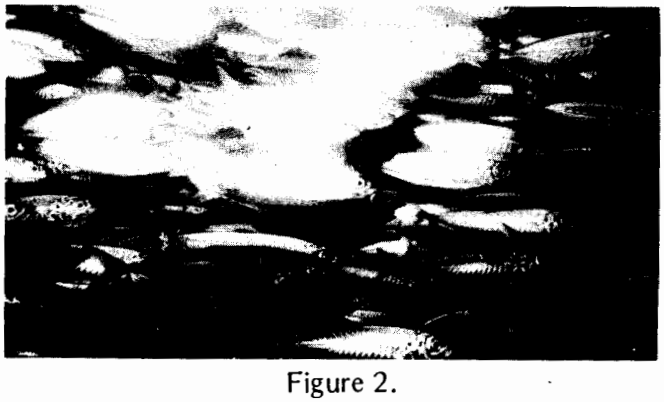

Figure 2.

A school of round scad, Decapterus punctatus, "hardened" below a U.S. Navy research platform off Panama City, Florida.

How does the concept of midwater structure design and deployment differ from conventional artificial reef construction and management methods? The obvious difference is in the choice of species to be attracted. The primary target species for midwater structures are pelagic fishes versus demersal species for bottom reefs. Another difference is the temporary nature of the midwater structure as opposed to the development of a benthic community on a conventional artificial reef. Relatively few organisms will be associated with the former, whereas many kinds of invertebrates and fishes will occupy the latter. As a tool for fishery management, midwater structures have the advantage of affecting fewer target species. You have more control over your methods by manipulating only a small segment of the coastal fish population. In addition, a pre-existing habitat and its associated fauna will not be permanently altered or displaced.

Pelagic fishes are more wide ranging in their habits than demersal species. Nocturnal movements of bait away from the structures may attract more predatory game fish to the site when they return at daylight. This possibility was supported by the repeatedly good catches made by charter boats.

Midwater structures are advantageous because of their simple construction and portability. They are readily deployed and moved about. Problems with labor and expensive transportation costs to the reef site are negligible when compared to bottom reef construction. They also offer less threat to a deep draft vessel if accidentally run down.

With restrictions placed on boat owners in terms of either rising fuel costs or shortages, judiciously placed midwater structures can reduce the time spent searching for fish. This is especially advantageous to the inexperienced fisherman.

Midwater structures can enhance the fishing experience in other ways. An abundant supply of live bait is usually present around the structure. An angler could easily capture several by snagging them, then bait a suitable rig and drift-fish in the same area. You can imagine the fight a king mackerel would give when caught in this manner as compared to trolling for them. Fly fishing, with its limited casting range, also would be exciting - especially if "school" dolphin are present.

To our knowledge, widespread application of midwater structures by sport fishermen has not occurred. Those who are dependent upon fishing for a

living probably are reluctant to share their labors and rights to these objects with competitors. As in the case of bottom artificial reefs, good organization and cooperative efforts between interested groups will be necessary for this fishery method to expand.

The few fishermen who have adopted this method are well pleased with their results. A captain operating in the northeastern Gulf of Mexico has been fishing midwater structures of his own design for several seasons. He uses 1 x 2 inch wooden strips, 12 to 14 feet long for each structure. The slat is tied by a line to a heavy weight. The length of the line determines the depth each slat is suspended below the surface (usually six feet). A small piece of styrofoam is nailed to the top of the slat to prevent it from sinking in a current or when it becomes waterlogged. About six slats are placed overboard per trolling site.

Another enterprising individual is hoping to develop a market for live round scad, locally called "cigar minnows," for the mackerel fishery. He has constructed a trawler-type hull out of ferro cement from which to fish. A large live well has been built to hold the bait. He may use midwater structures to "harden up" the bait in order to catch them with a purse seine, then anchor in the vicinity of the pass and sell his catch to passing fishermen.

More research is needed to determine the effectiveness of midwater structures in other coastal areas. Additional quantitative data is necessary to support the subjective statements made from numerous, but incidental, field observations. Biologists might consider using this method to increase the efficiency of in situ life history studies. We are presently planning to study the biology, ecology, and migrations of coastal pelagic game fish. These structures might provide us with a dependable source of fish for tagging purposes. If they are visited regularly throughout the season, information on seasonal distribution also can be obtained. Improvements are necessary to increase the structures' longevity at sea and their value as research tools.

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